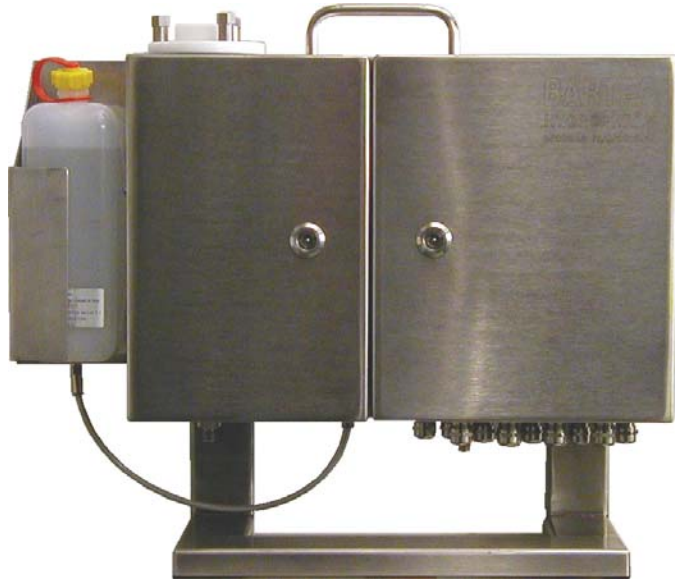


HYGROPHIL H 4230-10 process hygrometer

Continuous humidity measurement in industrial processes.

For very high demands in terms of being resistant to corrosion and dirt. Particularly suitable for cases where the air to be measured contains oil vapours, dust, water-soluble gases, solvents, acids and aggressive chemicals.

The device is certified by the German Technical Inspection Agency (TÜV) for the performance of flue gas measurements in accordance with the Federal German Pollution Control Act (BImSchV) (17th Implementing Ordinance).



In many processes, monitoring and controlling gas humidity is a must if you want to achieve a consistently high product quality, use energy efficiently and adhere to the regulations regarding emission limits.

HYGROPHIL H 4230 is a special measuring device that continuously measures the humidity levels during industrial processes.

Thanks to the carefully chosen materials and constant scavenging, the system is especially suitable for cases where the air to be measured contains oil or fat vapour, solvents, water-soluble gases or salts.

Examples:

- Hot-air tunnels for cooking foodstuffs
- Fertiliser dryers
- Various chemical processes

It can even be used in cases where the air to be measured is highly contaminated with acids or other aggressive substances (such as sulphuric acid, hydrofluoric acid or nitrohydrochloric acid).

Examples:

- Copper-nickel works
- Large combustion plants
- Combined heating and power stations
- Waste incineration plants

In power stations, incineration plants, and other industrial facilities, the amount of water vapour can also be measured in non-purified flue gas immediately downstream of the filter. This allows you to detect not only pipe damage, but also hairline cracks in the heat exchanger.

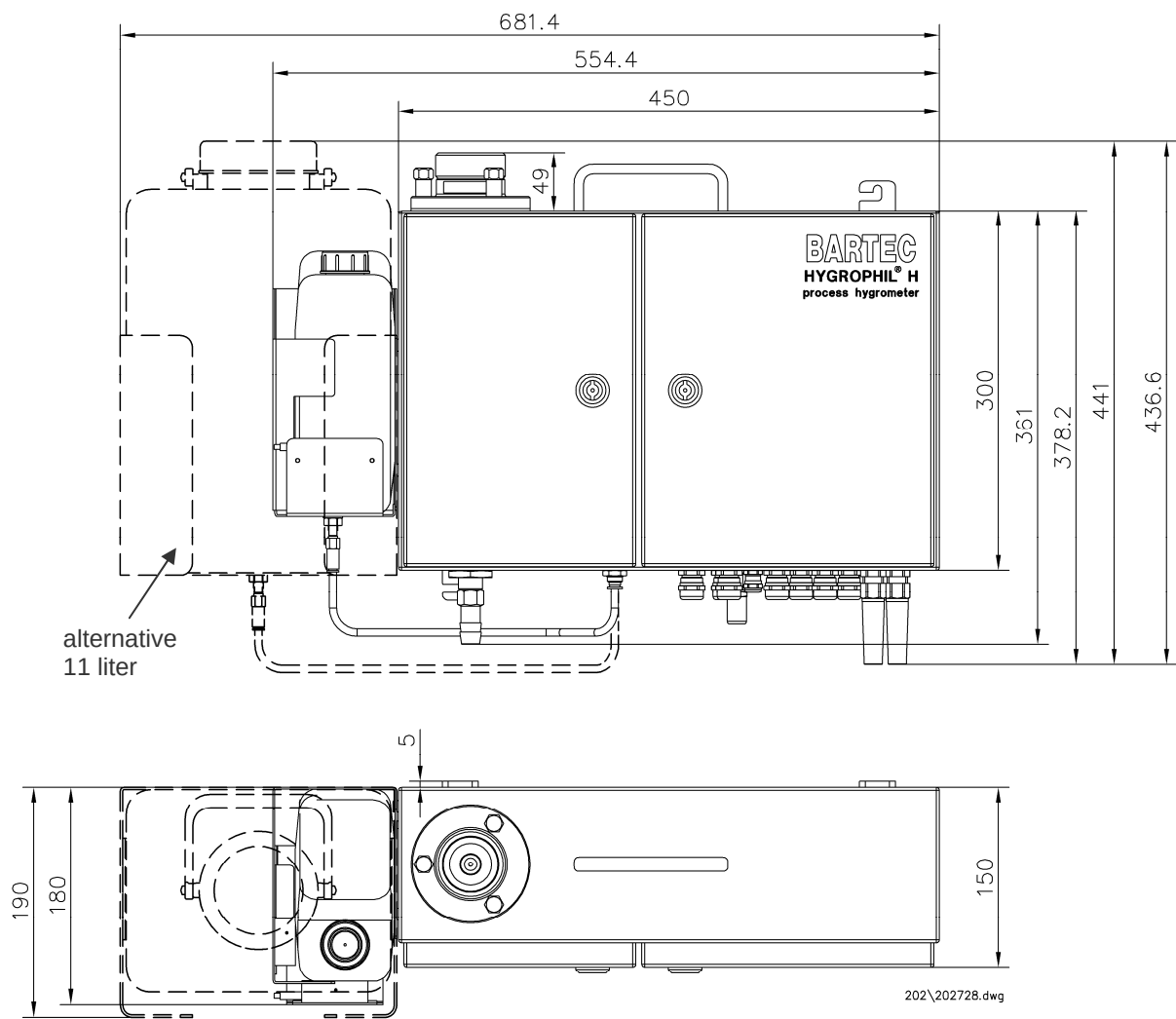
The portable design is particularly suitable for mobile application at the facilities of test centres and agencies for monitoring plants and at energy information centres.

Thanks to the standard method used, HYGROPHIL H is also suitable for use as a reference device.

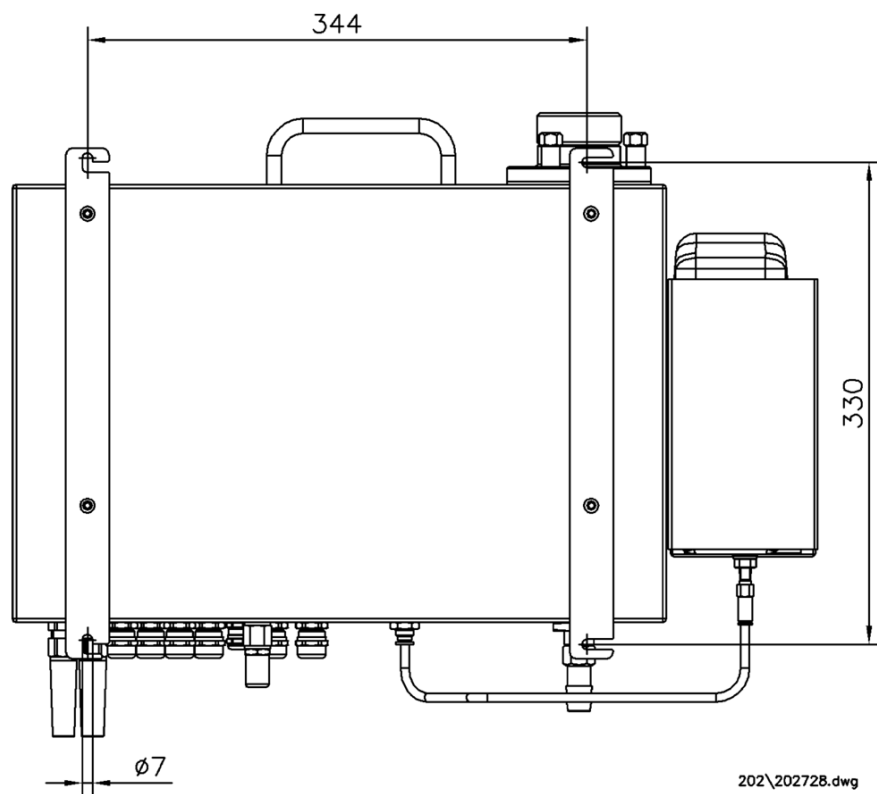
- **Measurement range:**
20...100 °C DT
- **Primary measurement variables:**
TT, HT, SP, aux. temperature
- **Calculated measurement variables:**
DT, MH, SH, vol.%, VP, h, DVP
- **Secondary standard method**
in accordance with DIN 50012
- **1 additional temperature**
measuring circuit for PT100
- **Current outputs 2x 0/4...20 mA**
electrically isolated
- **Profibus DP field bus**
- **Certified by the TÜV for use in**
accordance with the Federal
German Pollution Control Act
(BImSchV) (13th and 17th
Implementing Ordinances)

Technical data					
Humidity measurement					
Measurement principle		Psychrometric gas humidity measurement in line with the impact jet method			
Transducer		PT 100/ 4-conductor in accordance with DIN IEC 751			
Computational accuracy		≤ 0.01%			
Computing time		Approx. 2s			
Settling time		t ₉₀ = 90s (for sudden change in SH from 10 to 190 g/kg)			
Air/gas throughput		Max. 17,5 NI/min			
Water intake		Max. 25 ml/h (tube pump)			
Water reserve		2l (enough for approx. 3 days) or 11l			
Compressed air intake		2...5 bar (max. air consumption 2000NI/h)			
Measured variable inputs					
Measured variable		Measurement range	Resolution	Accuracy	Type
Dry temperature	TT	0...140 °C	0.1 °C	≤ 0.5% of the measurement range	Primary
Wet temperature	HT	0...140 °C			
Temperature	T1	0...200 °C			
Absolute pressure	SP	500...1500 hPa	1 hPa	≤ 1%	Calculated
Dew-point temperature	DT	20...100 °C	0.1 °C		
Volumetric content H ₂ O	Vol. %	2...100 %	0.1 %		
Absolute humidity	MH	15...1000 g/kg	1 g/kg		
Specific humidity	SH	15...1000 g/kg	1 g/kg		
Enthalpy	h	35...1000 kJ/kg	1 kJ/kg		
Current vapour pressure	VP	10...1000 hPa	1 hPa		
Saturation deficit	DVP	0...1000 hPa	1 hPa		
Outputs					
Signal output					
Analogue output		2 electrically isolated output channels, can be assigned to each of the measurement ranges, spread, error behaviour programmable			
Output signal		0...20 mA or 4...20 mA (programmable), linear			
Permissible load		≤ 500 Ω			
Accuracy		≤ 0.2% of the associated measured value			
Inputs					
External water detector		24 V d.c., NPN			
T1 _{extern}		PT 100/ 4-conductor in accordance with DIN IEC 751			
Data interface					
Field bus interface		Profibus DB			
Electrical data					
Auxiliary power		Measuring unit: 90...264 V a.c., 47...63 Hz, approx. 30 VA			
		Heating hose: 230 V or 115 V a.c.; approx. 100 VA/m			
Relays					
Warn relay		Display of warnings	Load: 1 A/24 V d.c., at least 10 mA		
ERROR-relay		Display of failures	Load: 1 A/24 V d.c., at least 10 mA		
Ambient conditions					
Permitted working temperature		+5...+50°C, with enclosure 4230-119 for explosion protected area 22: - 30 °C ... + 50 °C			
Permitted storage temperature		-20...+70°C (without water)			
Climate category		KWF in accordance with DIN 40040			
Reference conditions		23°C ±2°C / 230V ± 2%			
Mechanical data					
Enclosure		Stainless steel enclosure; protection rating IP64 in accordance with DIN 40050			
Dimensions		450×410×150 mm (without mount)			
Assembly drill holes		347x330 mm, 4×Ø7x13mm (M6)			
Weight		Approx. 12.5 kg			
Connections					
Electrical connection		Screw terminals 0.5-1.5 mm ² ; cable feed via M 16x1.5 cable gland			
Compressed air supply		Plug nipple NW 7			
Gas sampling hose connection		Special connection			

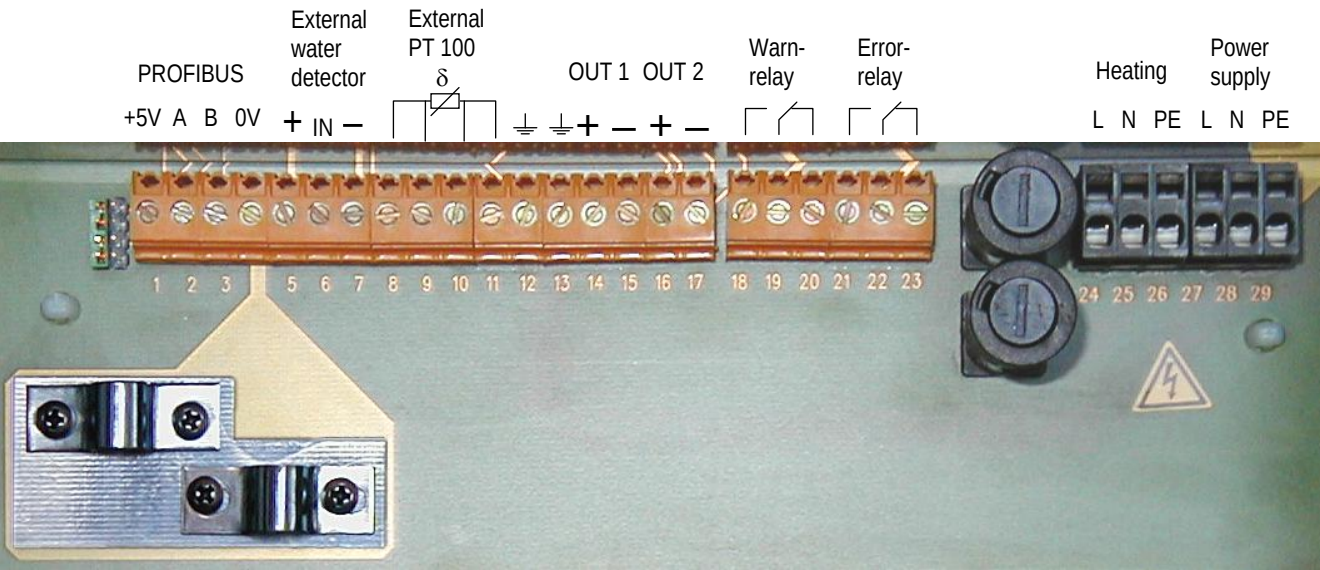
Dimensions



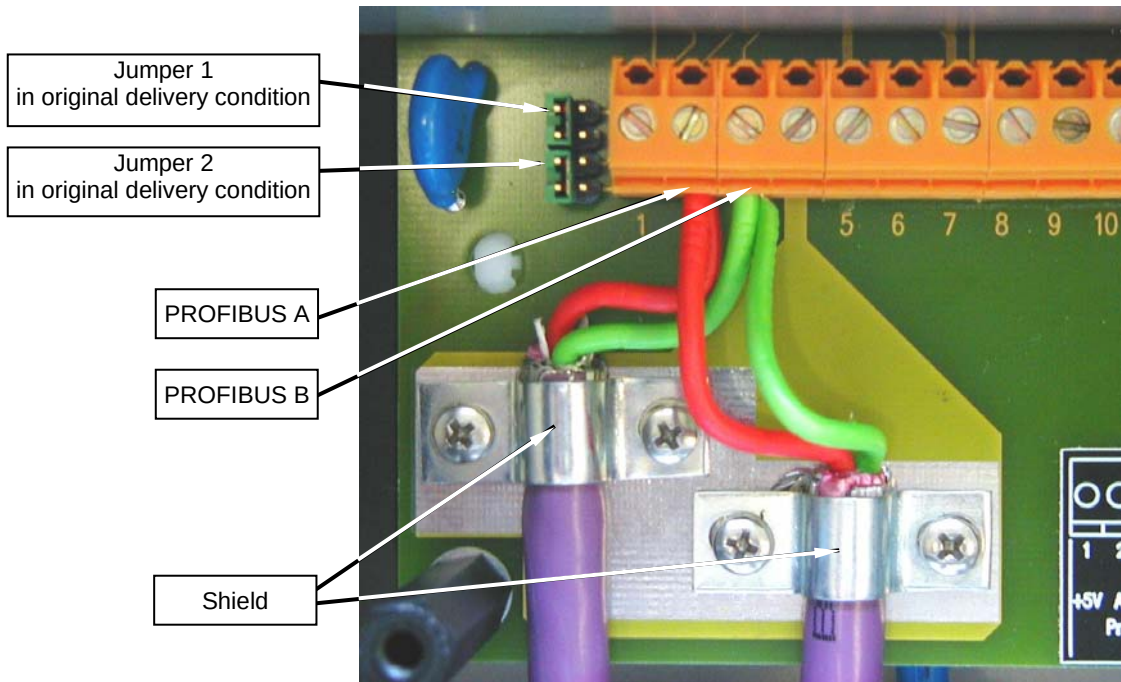
Assembly drill holes



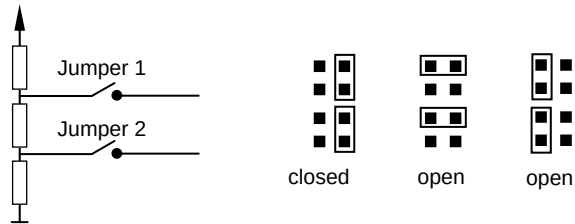
Assignment of terminals



The Profibus cable is connected to terminals 2 (Profibus A) and 3 (Profibus B).



If the device is the last user on the Profibus, the two jumpers must be closed.



Details when ordering

Basic equipment

HYGROPHIL H, Type 4230-10

Corrosion-proof, 115/230 V a.c.

Scope of delivery: Hygrophil-H in accordance with order number, 1 litre of surfactant

Order number: 202728

Accessories

Measurement gas tube, Type 4230-100

Flexible, water-resistant heating tube for feeding measurement gas without condensate (max. input temperature 200 °C)

Including 1 mount per metre

Operating voltage: 230 V a.c. or 115 V a.c.

Connection type: Universal conical nipple G3/8" DKR DIN3863



Order numbers: (230 V)	Length 1,0m	202729	Length 6,0m	290074
	Length 1,3m	289818	Length 7,0m	232553
	Length 2,0m	216375	Length 10,0m	294604
	Length 3,0m	202727	Length 12,0m	233793
	Length 4,0m	216376	Length 16,0m	281348
	Length 5,0m	216377		

Order numbers: (115 V)	Length 7,0m	306255
	Length 10,0m	302536
	Length 12,0m	292338

Measurement gas tube, Type 4230-114 Ex area 2/22

Flexible, water-resistant heating tube for feeding measurement gas without condensate (max. input temperature 120 °C)

Including 1 mount per metre

Operating voltage: 230 V a.c. or 115 V a.c.

Connection type: Universal conical nipple G3/8" DKR DIN3863



Order numbers: (230 V)	Length 10,0m	279259	Order numbers for 115 V version on request
	Length 12,0m	241974	
	Length 15,0m	300500	

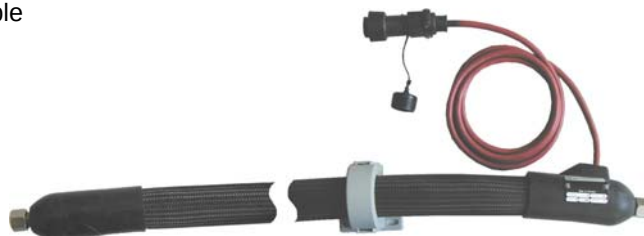
Measurement gas tube, Type 4200-06

Connection type:

Universal conical nipple

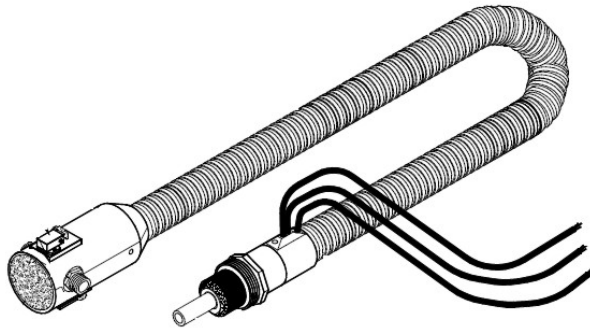
G 3/8" DKR DIN3863

PT 100



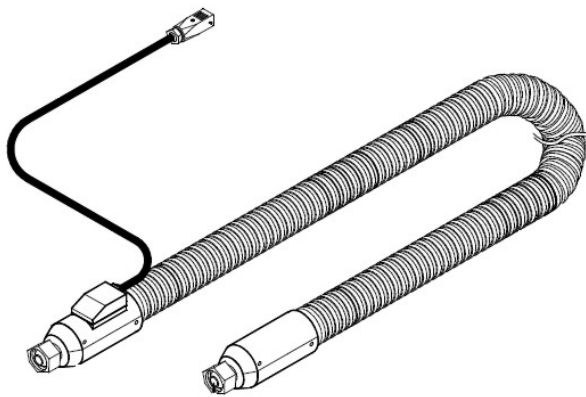
Order numbers:	Length 13,0m	U7521113420006	Length 23,0m	U7521123420006
	Length 15,0m	U7521115420006	Length 24,0m	320764
	Length 19,0m	202222	Length 26,0m	220718
	Length 20,0m	U7521120420006		

Measurement gas tube with switch, Type 4230-112



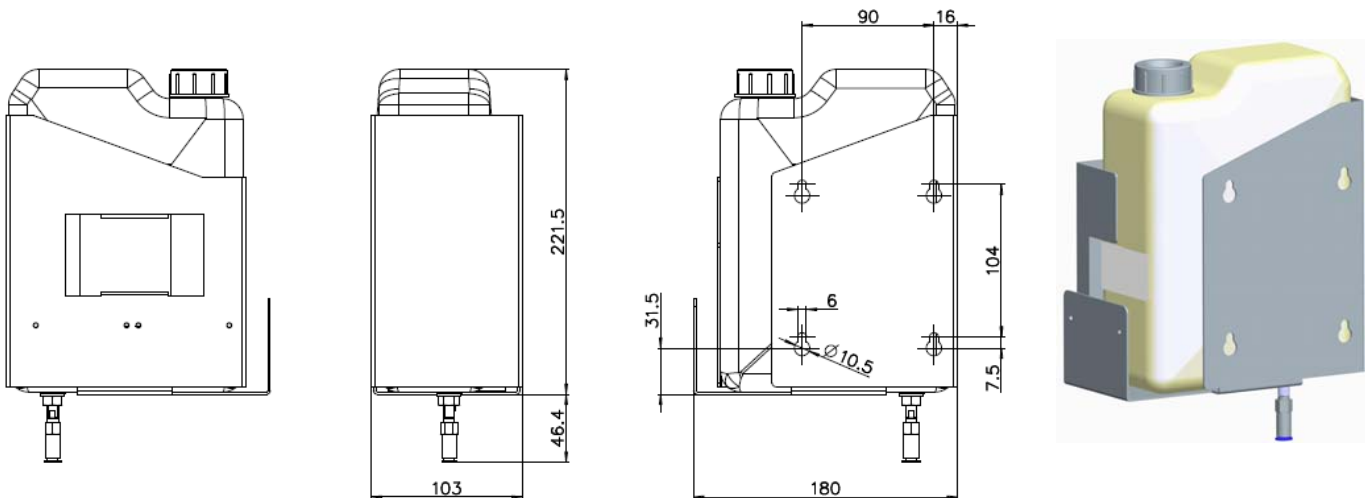
Order number: Length 2,5m 283058
(230 V)

Measurement gas tube self-regulating, Type 4230-128



Order number: Length 8,0m 348425
(230 V)

Water container 2l with holding, Type 4230-123



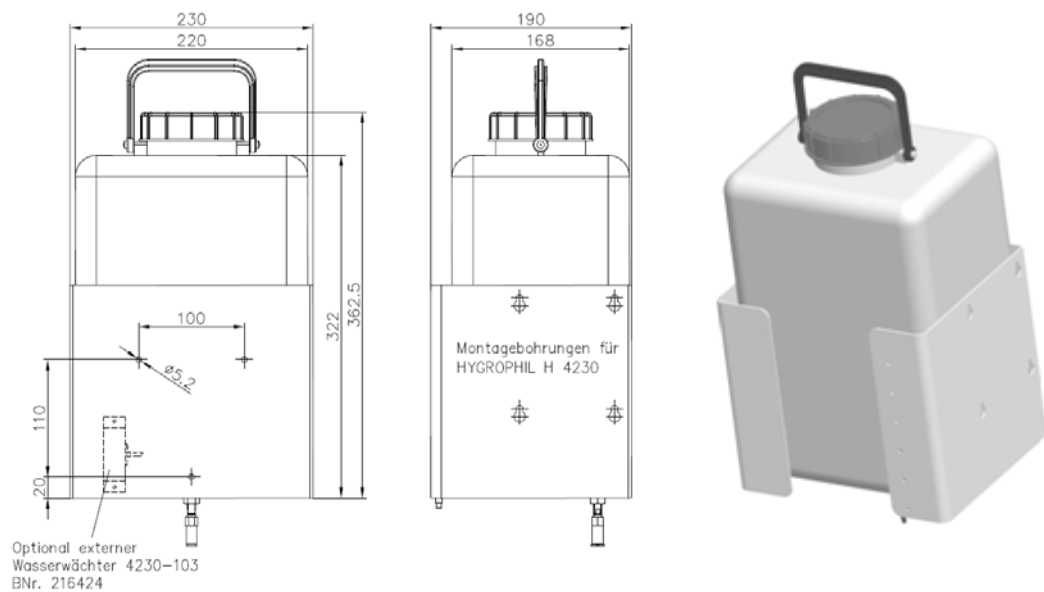
Order number: 304510

Water container , Type 4230-300



Order number: 202156

Water container 11l , Type 4230-102

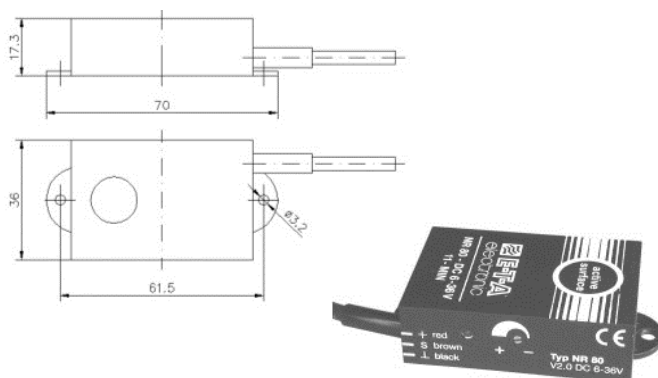


Order number: 216420

Water sensor external, Type 4230-103

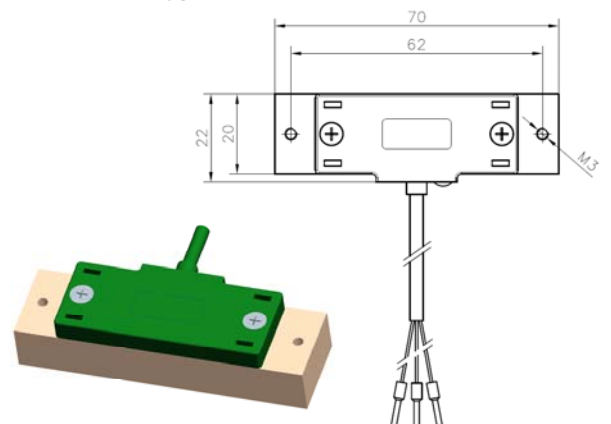
For monitoring the fill level in the water storage tank

Old construction type



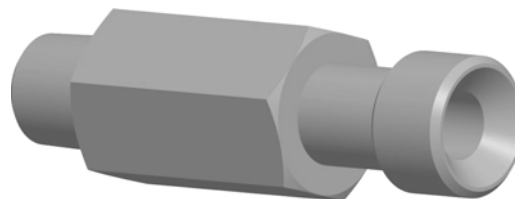
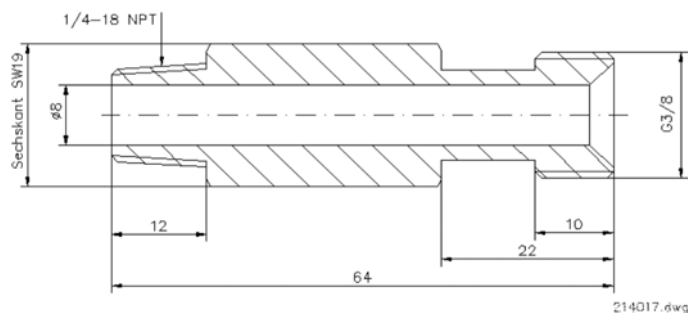
Order number: 216424

New construction type



**Adapter for gas sampling hose,
Type 4230-00-044**
(DKR-3/8" to NPT-1/4")

**Adapter for gas sampling hose Hastelloy,
Type 4230-00-068**
(DKR-3/8" to NPT-1/4")

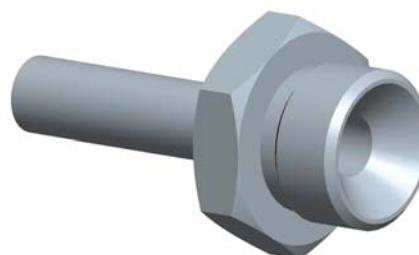
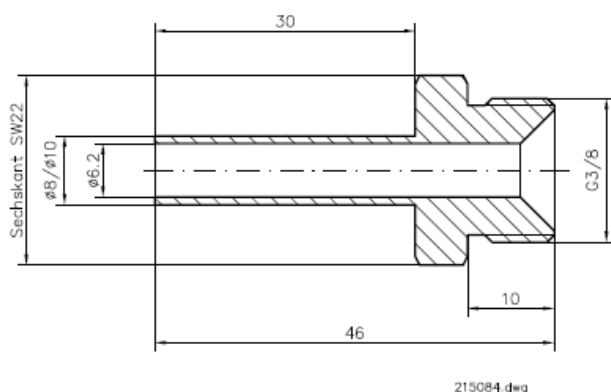


Order number: 214017

292981

**Adapter for gas sampling hose,
Type 4230-00-046**
(DKR-3/8" to 8 mm Swagelok)

**Adapter for gas sampling hose,
Type 4230-00-061**
(DKR-3/8" to 10 mm Swagelok)



Order number: 215084

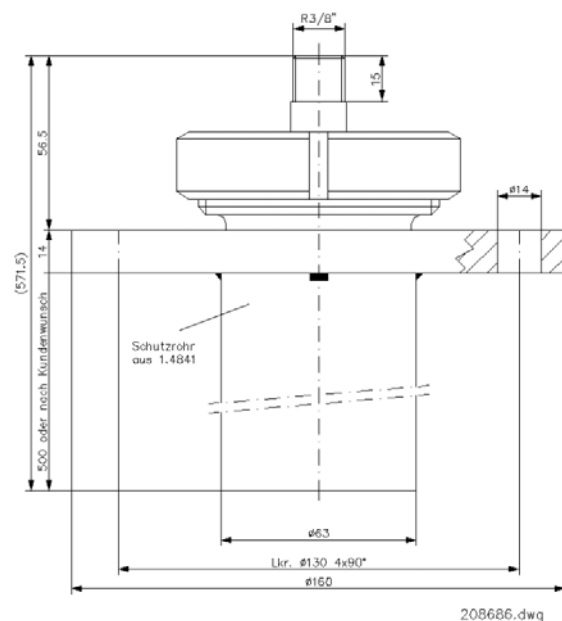
246326

Adapter 6HMK4SS Straight connector
(DKR-3/8", stainless steel)



Order number: 320763

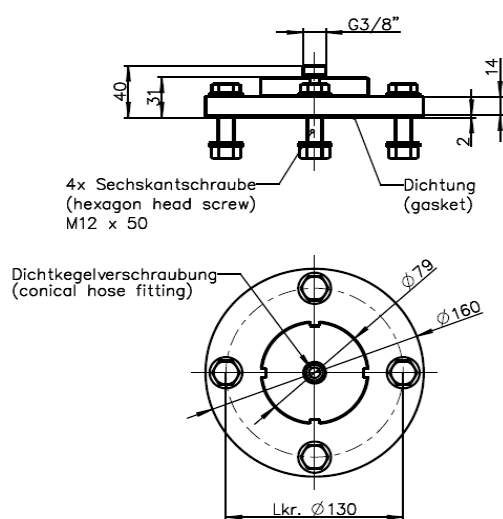
Standard filter, Type 4220-100 including filter cartridge 150-µm CrNi Steel 1.4404



208686.dwg

Order number: 208686

Filter flange , Type 4230-125 DN65/PN6



4x Sechskantschraube
(hexagon head screw)
M12 x 50

Dichtung
(gasket)

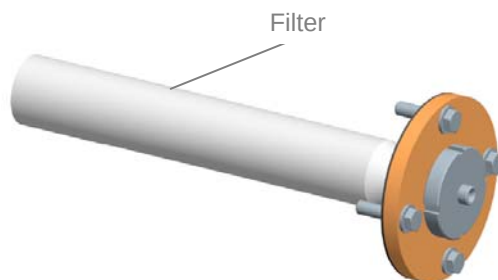
Dichtkegelverschraubung
(conical hose fitting)

Filter flange

Order number: 296346

Filter
Prefilter V20-6 500°C max.
520 x 60 mm

Filter
Prefilter V20-T 200°C max.
400 x 40 mm



Order number: 319545

302189

Gas sampling sensor,
Type SP 2000 GF 150

Gas sampling sensor Hastelloy,
Type SP 2000H/HC



Order number: 230 V 214334
 115 V 292337

230 V 292899

Sampling pipe for Gas sampling sensor,
Type SP 2000/SS

Sampling pipe for Gas sampling sensor Hastelloy,
Type SP 2000/HC



Order number: 214333

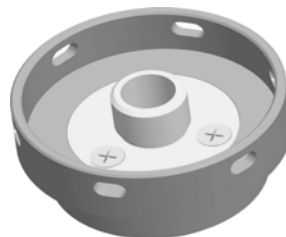
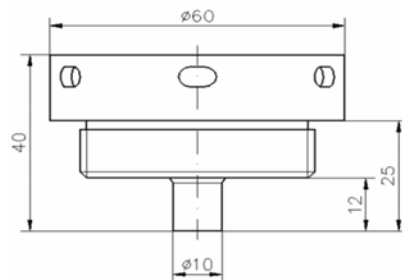
292898

Temperature Controller TRM/20, 0-200°C



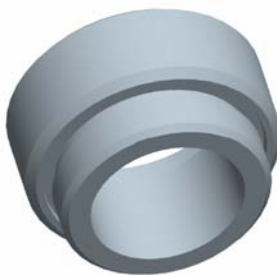
Order number: 314300

Adapter for gas sampling hose 4220 to 4230, Type 4230-101



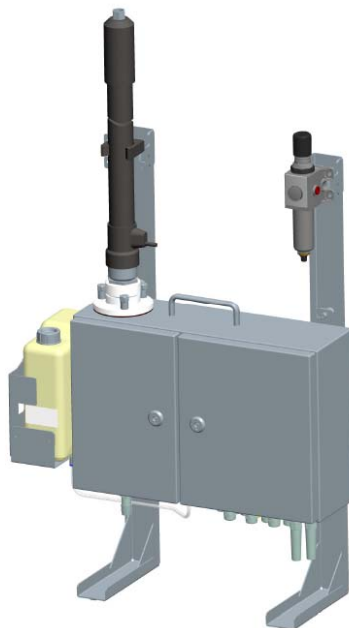
Order number: 216421

Nut for gas sampling hose, Type 4230-00-042



Order number: 202388

Stand holder, Type 4220-35

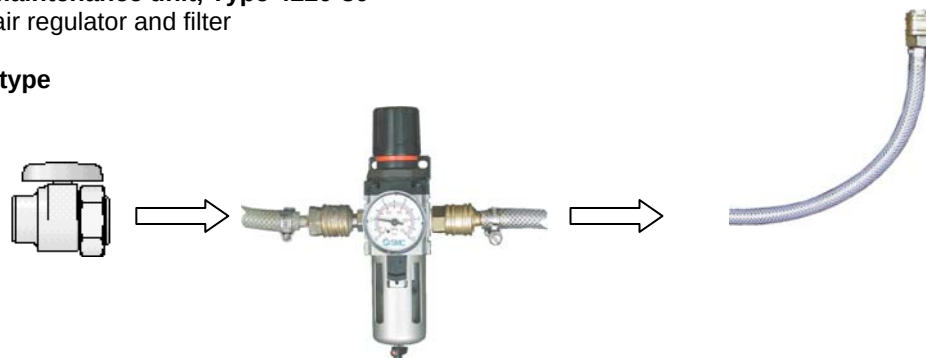


Order number: U 3401422035

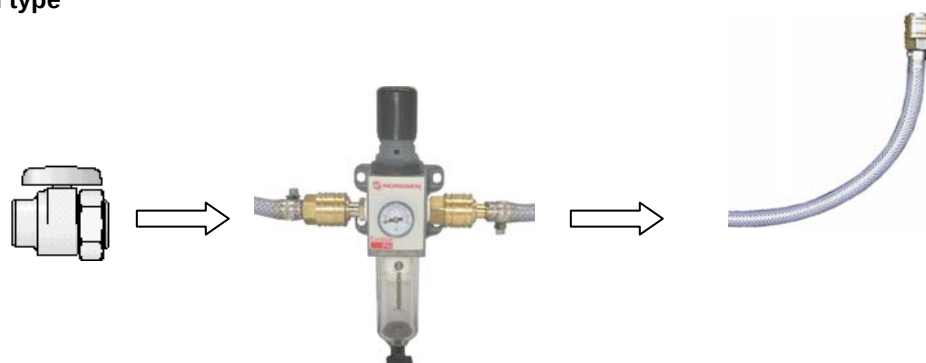
Compressed air maintenance unit, Type 4220-30

With compressed air regulator and filter

Old construction type



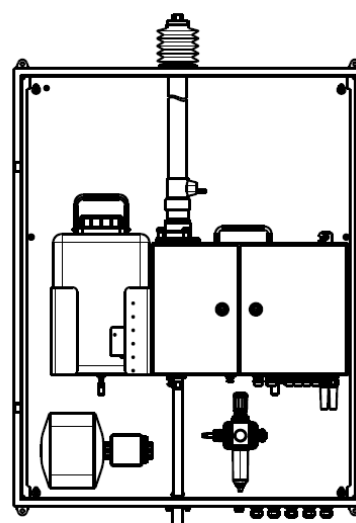
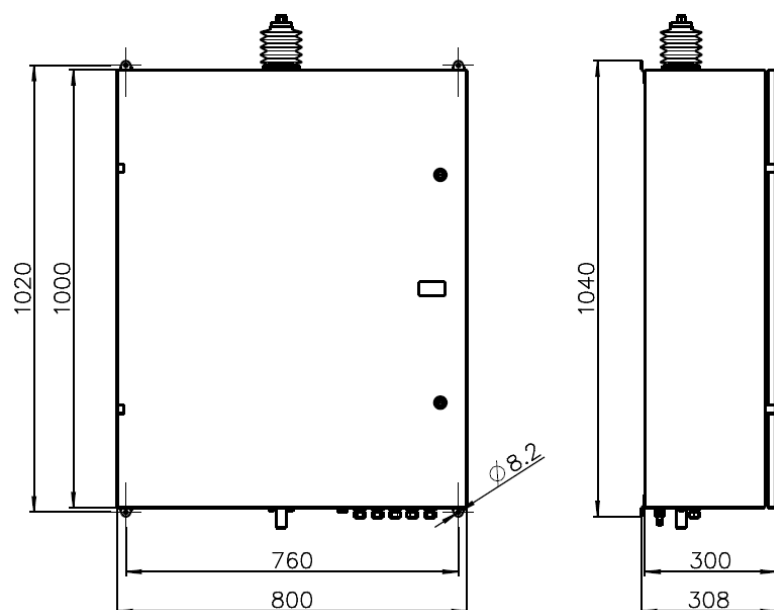
New construction type



Order number: U 3401422030

Enclosure, Type 4230-119 (Ex area 22)

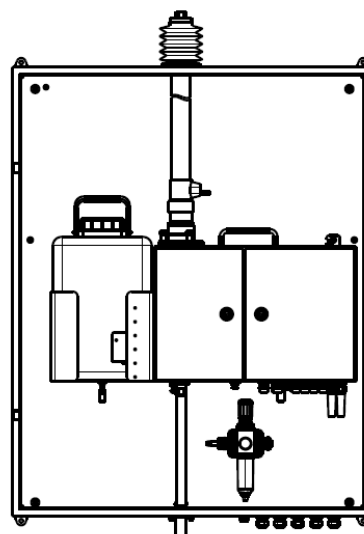
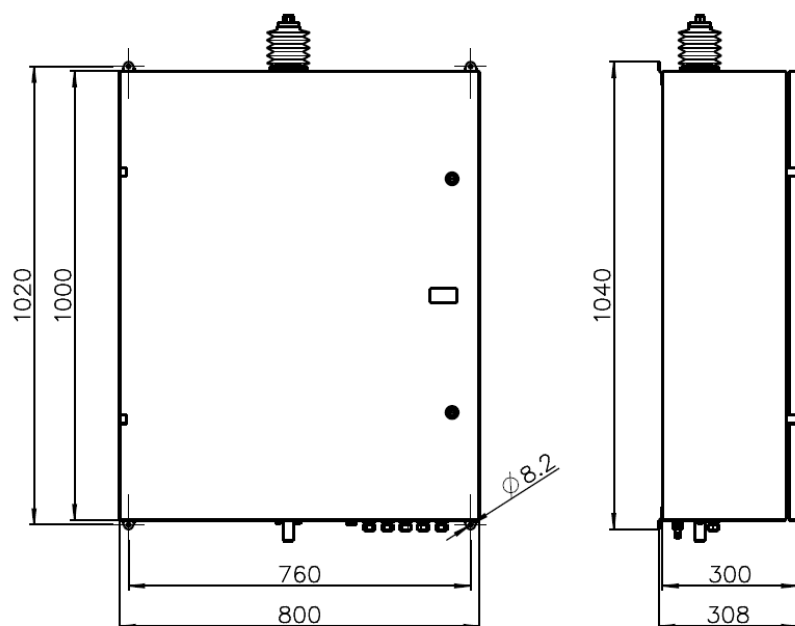
View without door



Order number: 295991

Enclosure, Type 4230-127 without heating (Ex Zone 22)

View without door



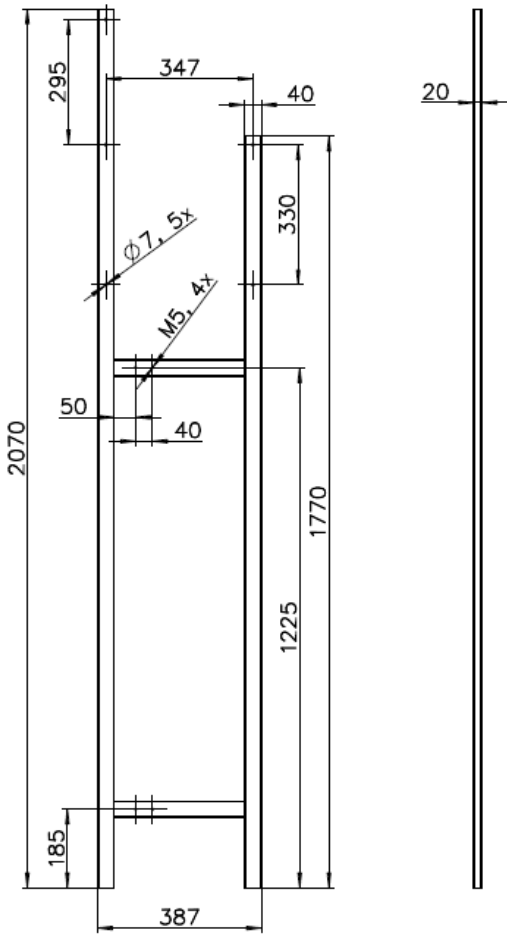
Order number: 321358

Flange carrying, Type 4230-126



Order number: 312707

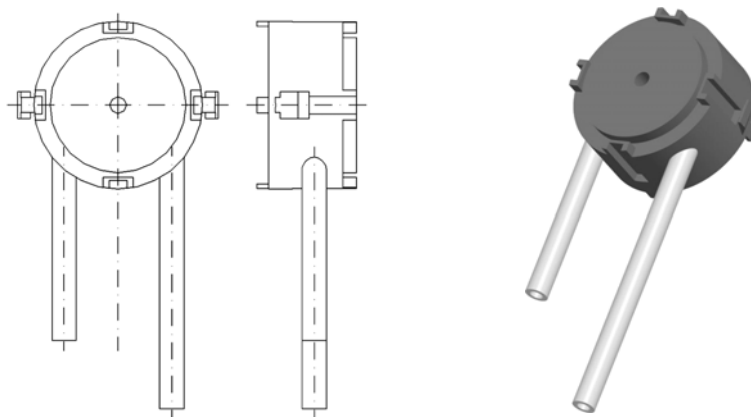
Assembly stand, Type 4230-120



Order number: 300545

Spare parts / expendable items

Tube pump cartridge, Type 4230-104



Order number: 216422

Measuring chamber with ejector, Type 4230-301

Without probes



Order number: 202383

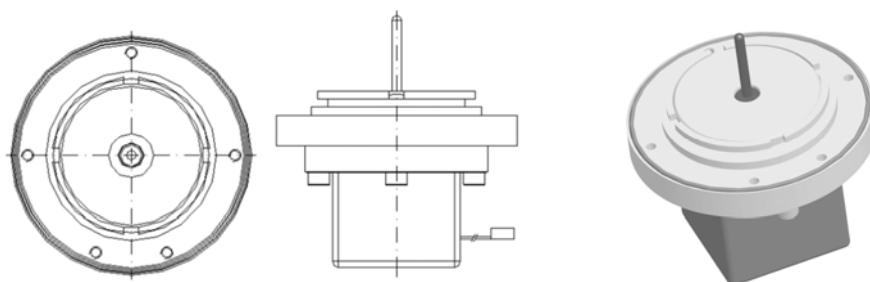
Water sensor, Type 4230-302

For monitoring the fill level in the measuring cell



Order number: 202823

Pump motor, Type 4230-303



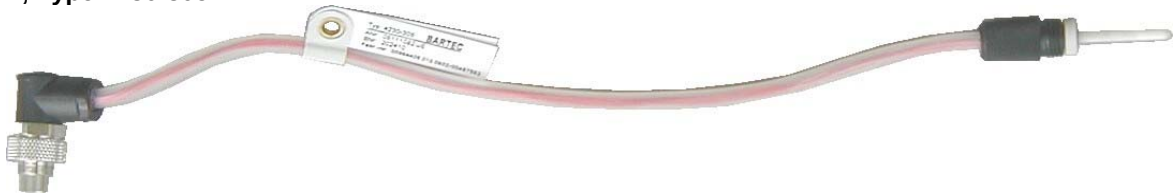
Order number: 202409

Probe TT, Type 4230-304



Order number: 202411

Probe HT, Type 4230-305



Order number: 202410

Proportional valve, Type 4230-308

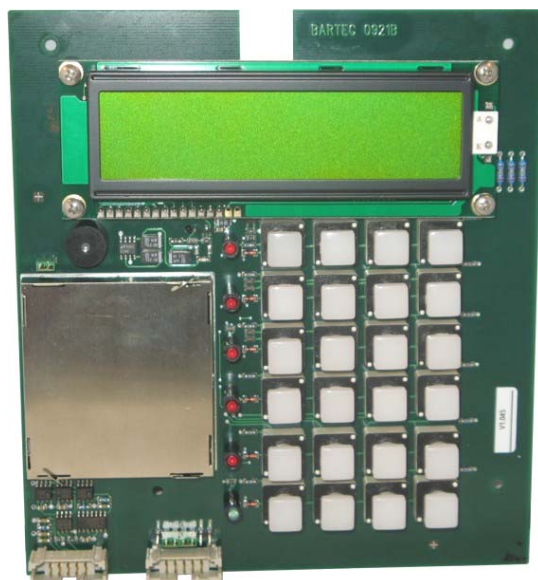


Order number: 202781

Display-/Profibus board Ser. A with push buttons, Type 4230-122

Notice:

Replacement for display/Profibus board Type 4230-401, order no: 214369 (no longer in our product range!)



Cover plate with front foil, Type 4230-121



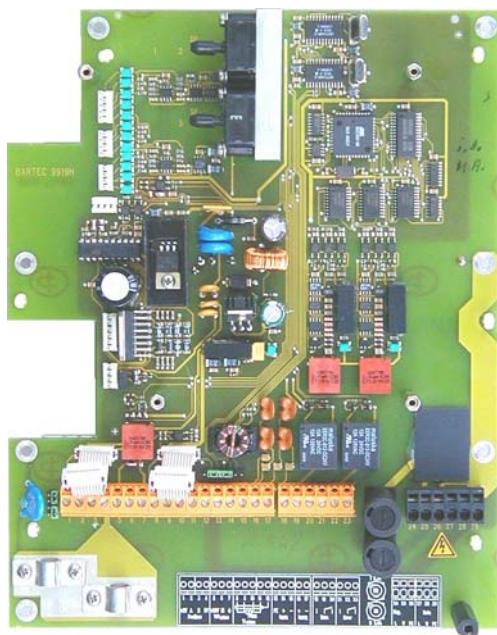
Please note for future repeat orders:

- for devices up to and including A. no. 10010456UE, in addition to the display/front board (order no. 301656), the cover plate with front foil (order no. 301657) is required for the first replacement order.
- for devices starting from A. no. 10010457, the cover plate with front foil Type 4230-121 is already included.

Order number: 301656

Order number: 301657

Electronic board, Type 4230-400



Order number: 202412

Surfactant

1l, PE bottle

Order number: U04014220201

Sinter filter , Type 4220-106

For standard filters

150 µm, Cr-Ni steel 1.4404



Order number: U 116006

Glass fibre filter, Type GF 150

for Gas sampling sensor Type SP 2000

0,1 µm



Order number: 220232